

WHAT IS CLAIMED IS:

1. A haze-resistant temperable coating carried by a substrate having a surface, comprising, from the substrate surface outwardly:

- a) an inner dielectric layer;
- b) a first infrared reflective layer;
- c) an intermediate dielectric stack comprising at least three intermediate dielectric layers, each of which have a physical thickness of no more than about 250Å, each of said intermediate dielectric layers having a different microstructure from each dielectric layer contiguous thereto to limit crystal growth therebetween during tempering;
- d) a second infrared reflective layer; and
- e) an outer dielectric layer.

2. The coating of claim 1 wherein each of the intermediate dielectric layers have a physical thickness of no more than about 225Å.

3. The coating of claim 1 wherein at least one of the intermediate dielectric layers is formed of a first dielectric and at least one of the remaining intermediate dielectric layers is formed of a second dielectric.

4. The coating of claim 1 wherein at least one of the intermediate dielectric layers is formed of a first dielectric comprising an oxide or suboxide and at least one of the intermediate dielectric layers contiguous thereto is formed of a second dielectric comprising a nitride.

5. The coating of claim 4 wherein the first dielectric comprises an oxide or suboxide of a metal comprising zinc, indium, tin, bismuth or an alloy of zinc, indium, tin or bismuth, and the second dielectric comprises a nitride of a metal which is different from the metal of the first dielectric.

6. The coating of claim 1 wherein at least one of the intermediate dielectric layers is polycrystalline and at least one of the intermediate dielectric layers contiguous thereto is substantially amorphous.

7. The coating of claim 1 wherein the intermediate dielectric stack comprises at least five intermediate dielectric layers.

8. The coating of claim 1 wherein a first of the intermediate dielectric layers is formed of a first dielectric, a second of the intermediate dielectric layers is formed of a second dielectric and is contiguous to the first intermediate dielectric layer, and a third of the intermediate dielectric layers is formed of the first dielectric and is contiguous to the second intermediate layer.

9. The coating of claim 8 wherein the intermediate dielectric stack further comprises a fourth intermediate dielectric layer of the second dielectric contiguous to the third intermediate dielectric layer, and a fifth intermediate dielectric layer of the first dielectric contiguous to the fourth intermediate dielectric layer.

10. The coating of claim 1 wherein a first of the intermediate dielectric layers comprises an oxide or suboxide of zinc, a second of the intermediate dielectric layers is contiguous to the first intermediate dielectric layer and comprises silicon nitride, and a third of the intermediate dielectric layers is contiguous to the second intermediate dielectric layer and comprises an oxide or suboxide of zinc.

11. The coating of claim 1 further comprising a sacrificial layer disposed between the first silver layer and the intermediate dielectric stack.

12. A haze-resistant temperable coating carried by a substrate having a surface, comprising, from the substrate surface outwardly:

- a) an inner dielectric layer;
- b) a first infrared reflective layer;
- c) an intermediate dielectric stack comprising alternating layers of a first dielectric and a second dielectric, each of said alternating layers having an optical thickness of no more than about  $450\text{\AA}$ , the first dielectric having an index of refraction between about 90% and 1100% of that of the second dielectric, and the first and second dielectric having different microstructures to limit crystal growth therebetween during tempering;
- d) a second infrared reflective layer; and
- e) an outer dielectric layer.

13. The coating of claim 12 wherein one of the first and second dielectrics is an oxide or suboxide and the other of the first and second dielectrics is a nitride.

14. The coating of claim 12 wherein one of the first and second dielectrics is polycrystalline  
5 and the other of the first and second dielectrics is substantially amorphous.

15. The coating of claim 12 wherein the first dielectric comprises an oxide or suboxide of a metal comprising zinc, indium, tin, bismuth or an alloy of zinc, indium, tin or bismuth, and the second dielectric comprises a nitride of a metal which is different from the metal of the first  
10 dielectric.

16. The coating of claim 12 wherein each of the layers of the first dielectric have an optical thickness greater than the optical thickness of any of the layers of the second dielectric.

17. The coating of claim 16 wherein the physical thickness of each of the layers of the first dielectric is between about 160Å and about 225Å and the physical thickness of each of the layers  
15 of the second dielectric is between about 100Å and about 150Å.

18. The coating of claim 12 wherein the intermediate dielectric stack comprises five of said  
20 alternating layers, with each of said alternating layers being contiguous to at least one other of said alternating layers.

19. The coating of claim 12 wherein the intermediate dielectric stack comprises a first intermediate layer of the first dielectric, a second intermediate layer of the second dielectric contiguous to the first intermediate layer, and a third intermediate layer of the first dielectric contiguous to the second intermediate layer.

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20. The coating of claim 19 wherein the intermediate dielectric stack further comprises a fourth intermediate layer of the second dielectric contiguous to the third intermediate layer, and a fifth intermediate layer of the first dielectric contiguous to the fourth intermediate layer.

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21. The coating of claim 12 wherein the first dielectric comprises an oxide or suboxide of zinc and the second dielectric comprises silicon nitride, the intermediate dielectric stack comprising a first intermediate layer of the zinc oxide or suboxide, a second intermediate layer of the silicon nitride contiguous to the first intermediate layer, and a third intermediate layer of the zinc oxide or suboxide contiguous to the second intermediate layer.

22. The coating of claim 12 further comprising a sacrificial layer disposed between the first, silver layer and the intermediate dielectric stack.

23. A haze-resistant temperable coating carried by a substrate having a surface, comprising, from the substrate surface outwardly:

- a) an inner dielectric layer;
- b) a first infrared reflective layer;

- c) an intermediate dielectric stack comprising alternating layers of a first dielectric and a second dielectric, each of said alternating layers having a physical thickness of no more than about 225Å, the first dielectric having an index of refraction between about 90% and 110% of that of the second dielectric, and the first and second dielectric having different microstructures to limit crystal growth therebetween during tempering;
- d) a second infrared reflective layer; and
- e) an outer dielectric layer.

24. The coating of claim 23 wherein one of the first and second dielectrics is a metal oxide or suboxide and the other of the first and second dielectrics is a metal nitride.

25. The coating of claim 23 wherein one of the first and second dielectrics is polycrystalline and the other of the first and second dielectrics is substantially amorphous.

26. The coating of claim 23 wherein the first dielectric comprises an oxide or suboxide of a metal comprising zinc, indium, tin, bismuth or an alloy of zinc, indium, tin or bismuth, and the second dielectric comprises a nitride of a metal which is different from the metal of the first dielectric.

27. The coating of claim 23 wherein each of the layers of the first dielectric have an optical thickness greater than the optical thickness of any of the layers of the second dielectric.

28. The coating of claim 27 wherein the physical thickness of each of the layers of the first dielectric is between about 160Å and about 225Å and the physical thickness of each of the layers of the second dielectric is between about 100Å and about 150Å.

29. The coating of claim 23 wherein the intermediate dielectric stack comprises five of said alternating layers, with each of said alternating layers being contiguous to at least one other of said alternating layers.

30. The coating of claim 23 wherein the intermediate dielectric stack comprises a first intermediate layer of the first dielectric, a second intermediate layer of the second dielectric contiguous to the first intermediate layer, and a third intermediate layer of the first dielectric contiguous to the second intermediate layer.

31. The coating of claim 30 wherein the intermediate dielectric stack further comprises a fourth intermediate layer of the second dielectric contiguous to the third intermediate layer, and a fifth intermediate layer of the first dielectric contiguous to the fourth intermediate layer.

32. The coating of claim 23 wherein the first dielectric comprises an oxide or suboxide of zinc and the second dielectric comprises silicon nitride, the intermediate dielectric stack comprising a first intermediate layer of the zinc oxide or suboxide, a second intermediate layer of the silicon nitride contiguous to the first intermediate layer, and a third intermediate layer of the zinc oxide or suboxide contiguous to the second intermediate layer.

33. The coating of claim 23 further comprising a sacrificial layer disposed between the first infrared reflective layer and the intermediate dielectric stack.

34. A haze-resistant temperable coating carried by a substrate having a surface, comprising,  
5 from the substrate surface outwardly:

- a) an inner dielectric layer;
- b) a first infrared reflective layer;
- c) an intermediate dielectric stack comprising alternating layers of a dielectric oxide and a dielectric nitride, each of said alternating layers having an optical thickness of no more than about 475Å, the dielectric oxide having an index of refraction between about 90% and 110% of that of the dielectric nitride, the dielectric oxide and the dielectric nitride having different microstructures to limit crystal growth therebetween during tempering;
- d) a second infrared reflective layer; and
- e) an outer dielectric layer.

35. The coating of claim 34 wherein each of the dielectric oxide layers has a physical thickness of between about 150Å and about 225Å and each of the dielectric nitride layers has a physical thickness of between about 100Å and about 150Å.

36. The coating of claim 34 wherein each of the dielectric oxide layers comprises an oxide or suboxide of a metal comprising zinc, indium, tin, bismuth or an alloy of zinc, indium, tin or



bismuth, and each of the dielectric nitride layers comprises a nitride of a metal which is different from the metal of an adjacent one of said dielectric oxide layers.

37. The coating of claim 34 wherein each of the dielectric oxide layers comprises an oxide or suboxide of the same metal.

38. The coating of claim 34 wherein each of the dielectric nitride layers comprises a nitride of the same metal.

39. The coating of claim 34 wherein each of the dielectric oxide layers comprises an oxide or suboxide of the same first metal and each of the dielectric nitride layers comprises a nitride of the same second metal, the first metal being different from the second metal.

40. A method of forming a coated glass article, the method comprising:

- a) providing a glass substrate;
- b) depositing a heat treatable coating on the glass substrate by:
  - i) depositing an inner dielectric layer;
  - ii) thereafter, depositing a first infrared reflective layer;
  - iii) thereafter, depositing an intermediate dielectric stack by depositing alternating layers of a first dielectric and a second dielectric, each of said alternating layers having an optical thickness of no more than about 450Å, the first dielectric having an index of refraction between about 90% and

110% of that of the second dielectric, and the first and second dielectric having different microstructures;

iv) thereafter, depositing a second infrared reflective layer; and

v) thereafter, depositing an outer dielectric layer.

5 c) heating the resultant coated glass substrate to a temperature of at least about 400°C, which temperature promotes crystal growth in at least one of the first and second dielectrics, the different microstructures of the first and second dielectrics limiting crystal growth therebetween during said heating.

10 41. The method of claim 40 wherein the first dielectric is an oxide or suboxide and the second dielectric is a nitride, the intermediate dielectric stack being deposited by depositing a first intermediate layer of the oxide or suboxide; depositing a second intermediate layer of the nitride on the first intermediate layer; and depositing a third intermediate layer of the oxide or suboxide on to the second intermediate layer.

15 42. The method of claim 41 wherein the first dielectric is an oxide or suboxide of zinc and the second dielectric is silicon nitride.

20 43. The method of claim 40 wherein the first dielectric is formed by sputtering a first target in an oxidizing atmosphere and the second dielectric is formed by sputtering a second target in a nitriding atmosphere.

44. The method of claim 43 wherein the first target comprises a metal or metal oxide and the second target comprises a metal or metal nitride.

45. The method of claim 43 wherein the first target comprises zinc, zinc oxide or zinc suboxide sputtered to deposit zinc oxide or zinc suboxide and the second target comprises silicon or silicon nitride.